
From: Dorsey, Nancy
Sent: Monday, September 22, 2014 8:31 AM
To: Dellinger, Philip
Subject: FW: "Traffic Light" sub-group...
Attachments: 2014GWPC_Preliminary0917.pdf

From: Ben Grunewald [mailto:ben@gwpc.org]
Sent: Friday, September 19, 2014 4:00 PM
To: Bauer, Robert A; Jeff Bull; Nygaard, Kris J; Tim Baker; WRish@hullinc.com; Dorsey, Nancy; Scott Anderson
Cc: Gerry Baker; Mike Paque
Subject: RE: "Traffic Light" sub-group...

Tim, Bill, Bob, Nancy, Scott, Jeff, and Kris..

I have appointed you 7 the 'executive decision team' for this sub-group. ... smile!

---- Jeff and Kris --- you are being asked to pull double duty – but should be MOST helpful

Would you have time for a conference call SOON to decide what we would like to accomplish in Seattle?

IF you accept, we would like to have a call next week to make decisions...

Would any of these times work??

THANKS! Ben
405 516 4972

	Tuesday Sept. 23 10:00am CT	Tuesday Sept. 23 2:00pm CT	Wed Sept. 24 10:00am CT	Wed Sept 24 2:00pm CT
Tim				
Bob				
Bill				
Nancy				
Scott				
Kris				
Jeff				
Ben	Yes	Yes	Yes	Yes

From: Ben Grunewald
Sent: Tuesday, August 26, 2014 9:49 AM
To: Ben Grunewald; 'Leslie Savage'; 'Bauer, Robert A'; 'robert.worstell@dnr.state.oh.us'; 'r.hoffman@kcc.ks.gov'; 'austin.holland@ou.edu'; 'Gertson, Rod'; 'Jeff Bull'; 'brian.woodard2@chk.com'; 'Nygaard, Kris J'; 'Timothy_Tyrrell@xtoenergy.com'; 'Linda McDonald'; 'dhenry@hilcorp.com'; 'Dellinger, Philip'; 'platt.steve@epa.gov'; 'Bates, William'; 'Scott Anderson'; 'Trenton Cladouhos'; 'Grant Bromhal'; 'Tim Baker'; 'Gerry Baker'; Mike Paque; 'Steele,

Edward (GE Global Research); 'tom.kropatsch@wyo.gov'; 'WRish@hullinc.com'; 'Brad Bacon'; 'Dorsey.Nancy@epa.gov'
Subject: RE: "Traffic Light" sub-group...

Below are a few items that were communicated before and after the call – PLEASE feel free to add – please see “takeaways” or other details at the end of this email...

From Jeff Bull:

- Objective: develop a frame work from which a stop light system could be put in place should one want to (operator or regulator)
- Things to consider:
 - Stop light system is a risk management tool and not intended to be a black and white regulatory tool that determines final definitive action.
 - A “universal” stop light system is not practical because the definition of the hazard and impact necessary to inform a stoplight system varies from play to play on a macro view and within a play (10-20 mile area) from a micro view
 - Stop light system needs to be informed by projection of energy released as it relates to ground motion at the surface that has the potential to cause damage which is dependent upon area geology, characteristics of area faulting, depth of faults, characteristics of the formation into which one is injecting, depth of faults and historic seismicity, predictive modeling for the area of energy released versus level of ground shaking, demographics of area

Feel free to share my thoughts...look forward to hearing how the discussion goes and participating in the future.

Jeff Bull
Manager Regulatory Operations - MidCon
Chesapeake Energy Corporation

From Bill Bates
Hi Ben,

Here is a link to an example of a traffic light system for an EPA permit. Granted it is for a Class VI permit, but it is an example none the less.

<http://www.epa.gov/region5/water/uic/adm/pdfs/adm-ccs2-attachment-f-emergency-and-remedial-response-plan-201404.pdf>

It starts on page F7.

William J. L. Bates
Geologist
U.S. EPA
Office of Ground Water & Drinking Water: Prevention Branch
202-564-6165

From Nancy Dorsey – EPA Region 6 (Also see attached)

In our NTW draft report we included a number of different considerations broken down as operation, monitoring or management. As the draft was already provided to GWPC after release under FOIA, I clipped the relevant pages and attached them to this email.

An idea that may be worth discussing in Seattle, related to additional information that may be requested under the traffic light model.

If the state agency requests more frequent injection data (daily volumes, with maximum and average pressure). The wells historic data is equally important for two reasons: 1) It potentially allows a view of the wells behavior before area seismicity 2) It shows if there are changes occurring in the wells injectivity response. The latter changes would then need to be viewed along the lines of the age old chicken and the egg question—which came first, the change in the well behavior or the seismicity. Why is a whole different question, that will take much more information to answer.

With respect to the historic data, using reported injection volumes and pressures filed with the state agency can be used to provide a (relatively) quick look at the wells injectivity pattern. These standard reservoir engineering plots will show if the well flow is linear or more homogeneous and if over time there are changes. State knowledge of other wells injecting in the formation, faults, fractured nature of the formation, etc. is vital to the interpretation, but so is the reporting quality. To be useful for this purpose the annual injection history should be provided at least on a monthly basis, and contain actual data. It is not unusual for some operators to take a short cut when filling out the forms by entering constant pressures and possibly constant volumes. (Yes, wells on a vacuum would correctly be constant 0 pressure.)

(I did not get a direct email, so could not send this to all the Subgroup members.)

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Please feel free to add to key points and takeaways...

- 1) Correlation between volume reduction and reduced activity as apposed to pressure reduction (Worstall)**
- 2) 'One size' approach does not work as there are vast geologic variations**
- 3) further develop the concept of process**
- 4) How do you get back to yellow and/or green**
- 5) Threshold parameters need to be discussed for both monitoring and action**
- 6) Assessing and communicating relative risk is key**
- 7) moving from Green to Red is one, thing, BUT moving back to yellow or green, is not well defined**

Ben Grunewald
405 516 4972
Thanks – Ben 405 516 4972